Novel Approaches to Prediction in Severe Brain Injury

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Structured Abstract:

Purpose of review: Recovery after severe brain injury is variable and challenging to accurately predict at the individual patient level. This review highlights new developments in clinical prognostication with a special focus on the prediction of consciousness and increasing reliance on methods from data science.

Recent findings: Recent research has leveraged serum biomarkers, quantitative electroencephalography, magnetic resonance imaging physiological time-series to build models for recovery prediction. The analysis of high-resolution data and the integration of features from different modalities can be approached with efficient computational techniques.

Summary: Advances in neurophysiology and neuroimaging, in combination with computational methods, represent a novel paradigm for prediction of consciousness and functional recovery after severe brain injury. Research is needed to produce reliable, patient-level predictions that could meaningfully impact clinical decision making.

Keywords

traumatic brain injury; anoxic brain injury; coma; electroencephalography; consciousness

Introduction

Despite advances in care, the burden of severe traumatic and nontraumatic brain injury (designated here collectively as 'acute brain injury' [ABI]) remains high both in terms of mortality and long-term disability. With advances in intensive care, withdrawal of life sustaining-therapies (WLST) is emerging as the most common proximate cause of death in comatose patients with acute brain injury [1]. This raises serious ethical concerns, since current approaches to predict recovery of consciousness and functional independence lack accuracy.

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BF, RS: none

JC: minority shareholder at iCE Neurosystems